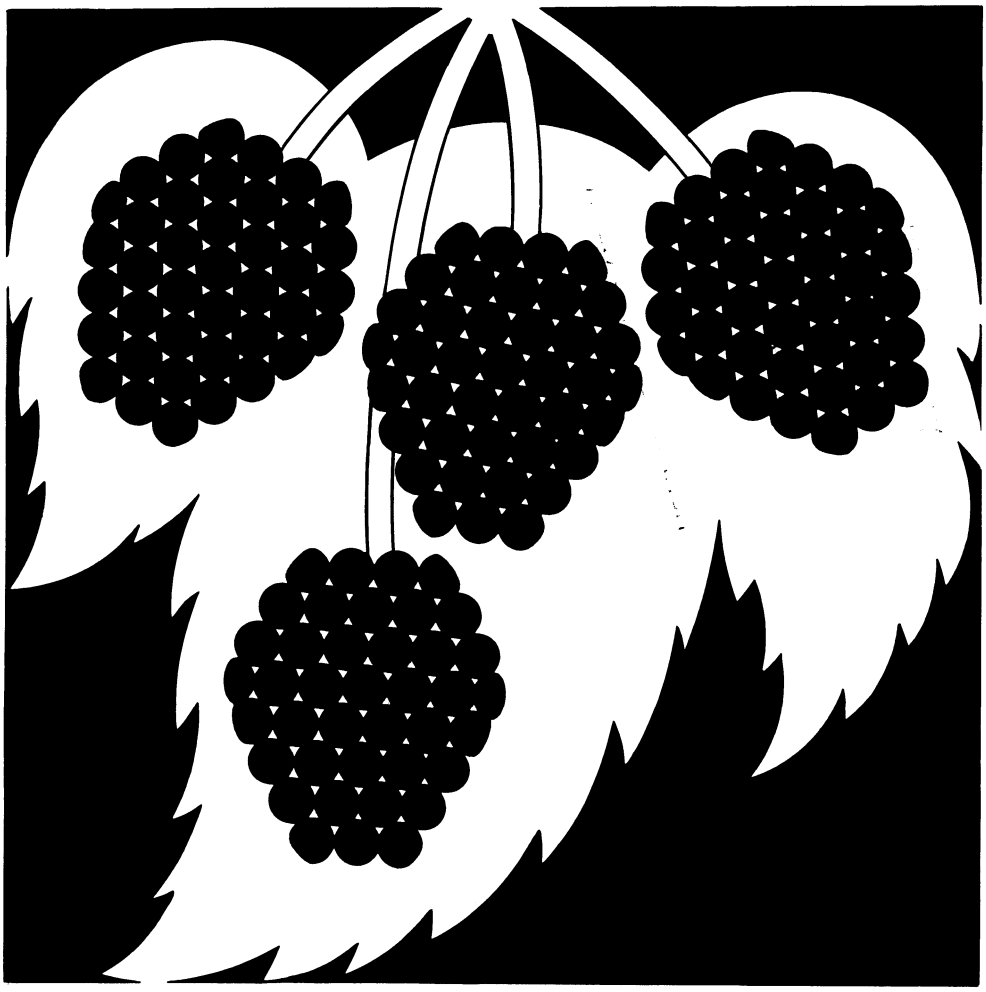
Growing Raspberries



UNITED STATES DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN NUMBER 2165

PREPARED BY SCIENCE AND EDUCATION ADMINISTRATION

A raspberry plantation that is properly managed should yield at least 4,000 pounds (4485 kg/ha) of berries per acre by the second year. To get greatest yield and longest productive life from the plantation—

- Choose types and varieties that are adapted to your area.
- Prepare the soil thoroughly.
- Plant only the highest quality stock.
- Maintain a high level of soil moisture by cultivating frequently and irrigating when necessary.
- Apply fertilizer to the plantation every year.
- Cut out all weak canes and suckers.
- Protect plants from insects, diseases, and winter injury.

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GROWING RASPBERRIES

By FRANCIS J. LAWRENCE, *SEA research horticulturist* [1]

Raspberries grow best in cool climates. They are not well adapted south of Virginia, Tennessee, or Missouri. Nor are they well adapted to areas in the Plains States or Mountain States where summers are hot and dry and winters are severe.

TYPES OF RASPBERRIES

Three main types of raspberries—red, black, and purple—are grown in the United States. They differ in several ways other than the color of their fruit.

Red raspberries have erect canes. They usually are propagated by suckers, which grow from the roots of the parent plant. Red raspberries are grown most extensively in the Northwest.

Black raspberries (blackcaps) have arched canes that root at the tips. They are propagated by the plants that grow at the tips of the canes. Blackcaps are grown mostly in the eastern half of the country and in Oregon.

Purple raspberries are hybrids of red raspberries and blackcaps. They have the same growth characteristics as black caps and are propagated in the same way. They are grown extensively only in western New York, though the area where they are adapted is about the same as the area where blackcaps are grown.

Some raspberries have yellow fruit. Yellow raspberries are variations of red raspberries and, except for fruit color, have all the characteristics of red raspberries. They are grown chiefly in home gardens.

For descriptions of raspberry varieties, see page 12.

PLANTING SITE

A wide range of soil types, from sandy loam to clay loam, is satisfactory for growing raspberries. The character of the subsoil is more important than the type of surface soil. The subsoil should be deep and well drained.

If the subsoil is underlaid by a shallow hardpan or water table, the root system of the raspberry plant will be restricted in its development. Plants with restricted root systems may be damaged

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during a drought because raspberries need an abundant supply of moisture at all times during the growing season. Raspberries also suffer from root rots in poorly drained soils.

The slope and exposure of the planting site may be important. In areas where winters are severe, raspberries planted on hillsides are in less danger of winter injury than raspberries planted in valleys. In the southern part of the raspberry-growing area, sites with a northern or northeastern exposure retain humus and moisture longer and are better suited to raspberries than sites with a southern exposure.

PLANTING

In the East, plant raspberries in the spring. On the Pacific coast, plant them in the spring or during the rainy season.

Plant only the highest quality stock from a nursery that is certified disease free. If you propagate your own stock, plant only the most vigorous tip plants or suckers.

Preparing the Soil

For best results, prepare the soil for raspberries as follows:

- Plow, in early spring, to a depth of at least 6 inches (15 cm).
- Disk and harrow the soil just before setting the plants.

Prepare the soil for raspberries as thoroughly as you would for corn.

A good plan is to seed and plow under one or two green-manure crops of oats or barley with vetch before you establish a raspberry plantation. This thorough working gets the soil in good condition for planting, and the added organic matter and nitrogen help the plantation to produce an early fruit crop.

Most land that has been in cultivated crops is in good condition for growing raspberries.

Raspberries should not follow potatoes, tomatoes, or eggplant; wilt diseases that affect these crops also affect raspberries. The fungus causing wilt may remain in the soil and damage the raspberry plants.

Immediately before setting the plants, disk and harrow the soil.

Spacing the Plants

Spacing for raspberry plants depends on the system of training you plan to use and on the type of cultivating equipment you own.

Raspberry plants can be set in hills and cultivated on all four sides or set in rows and cultivated on two sides.

For planting in hills, space the plants far enough apart each way so you can cultivate between them. Aline the plants in each direction.

For planting in rows, space the rows far enough apart to cultivate with the equipment you have. Set red raspberry plants 2 to 3 feet (0.5 to 1.0 m) apart in the rows and black raspberry plants 4 to 5 feet (1.2 to 1.5 m) apart.

If you plan to cultivate with a

garden tractor or wheel hoe, 5 feet (1.5 m) is enough distance between hills or rows.

If you plan to use a farm tractor, leave 7 to 10 feet (2.0 to 3.0 m) between rows.

Setting the Plants

Do not let planting stock dry out. If you cannot plant the stock as soon as you receive it, protect the roots from drying by heeling in the plants.

To heel in, dig a trench deep enough to contain the roots. Spread the plants along the trench, roots down, and cover the roots with moist soil.

If the plants are dry when you receive them, soak the roots in water for several hours before you plant them or heel them in.

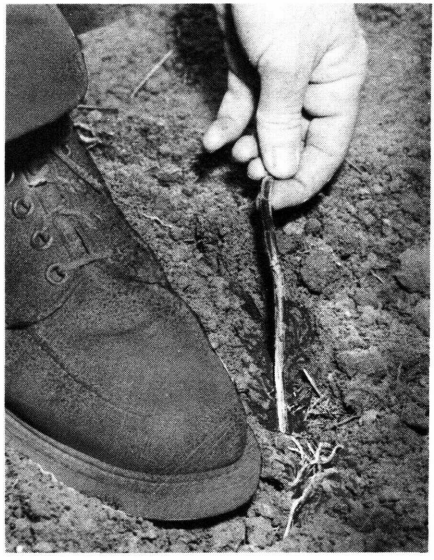
When you are ready to set the plants out in the field, keep them moist by covering the bundles or lots of plants with wet burlap or canvas, or with plastic film until they are planted.

Before setting the plants, cut the tops back so they are about 6 inches (15 cm) long. The 6-inch (15 cm) top is useful as a handle when setting the plants and will serve to show the location of the plants and aid in alining them.

To make a planting hole, cut a slit in the soil with a mattock

N35736
Heeling in red raspberry plants.

N35716
Setting a tip plant of black raspberry.



N35717
Firming the soil around the roots of a newly set plant.

N35718

Cutting off the protruding cane of a newly set black raspberry plant as a disease-control measure.

blade or shovel. Press the handle of the tool forward to open the slit.

Put the root of the raspberry plant into this opening. Set red raspberry plants so they are 2 to 3 inches (5.0 - 7.5 cm) deeper than they were in the nursery. Set black or purple raspberries the same depth as they were in the nursery or no more than 1 inch (2.5 cm) deeper.

Withdraw the blade of the mattock or shovel from the soil and firm the soil around the roots of the plant with your foot.

After the planting has been set, go over the planting again and cut off all protruding canes to help control diseases.

TRAINING AND PRUNING

Raspberries are easier to cultivate if they are planted in hills than if they are planted in rows. This is not the best training method, however. The plants are set more profitably in rows and the canes trained to wire trellises. The wires to which the canes are tied are strung between posts set 15 to 30 feet (4.5–9.0 m) apart in the rows. Two wires are spaced about 2½ and 5 feet (75 cm and 1.5 m) above the ground.

If stakes are available, drive a stake into the ground 1 foot (30 cm) from the plant the following year after planting. Tie the canes to the stakes at a point halfway between the ground and the tips of the canes and again near the ends of the canes.

Black and purple raspberries need not be tied; just top them to keep them from growing too tall. Top black raspberries at a height of 18 to 24 inches (45–60 cm). Top purple raspberries at a height of 30 to 36 inches (75–1.0 m).

This topping is done by cutting off the ends of the canes as they reach the proper height.

Toward the end of the first season, the canes send out laterals (side branches). The next season small branches grow from buds on the laterals. Fruit is borne on these small branches.

The laterals should be pruned back in the spring, before growth starts. Fruit from pruned laterals is larger and of better market quality than fruit from unpruned laterals.

Cut the laterals back so that two buds per lateral are left on slim canes, up to six buds per lateral on stout canes.

BN-35909

Left: Black raspberry plant before pruning. Right: The same plant after pruning.

THINNING

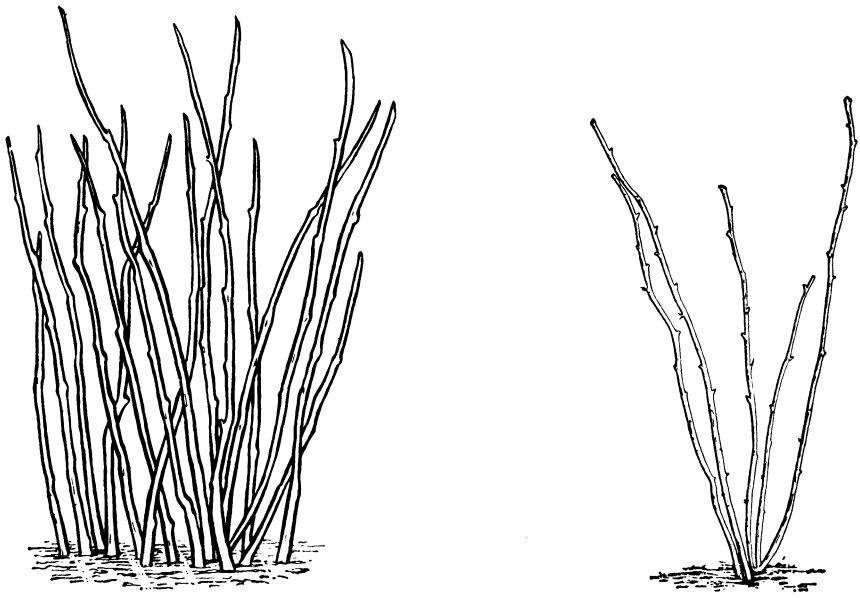
June- and July-cropping raspberry canes are biennial; they grow the first year, fruit the second, then die. Only the crown and the roots are perennial. Old canes should be removed as soon as their fruit is harvested.

Fall-bearing or fall-cropping red raspberries bear fruit on the new canes, flowering first at the tips and then from side branches. These usually start ripening during late August in the East and September in the West and continue until frost. These canes may be cut off at the ground level for producing next year's crop in the fall or a lower portion of the cane saved to fruit next June or July.

New canes grow from buds on the base of the old canes. Two to three new shoots usually come up each year from the base of each fruiting cane. In addition, suckers grow directly from the roots of red raspberries. The new canes and suckers should be thinned immediately after harvest.

Remove weak new shoots and most of the suckers from red raspberries. In the West leave about 7 to 12 strong canes per hill and space on the wires. Do not bunch canes together.

To thin black or purple raspberries, remove canes that are under ½ inch (1.2 cm) in diameter. Most black raspberry plants have four or five canes that are over ½ inch (1.2 cm), but if all the canes are smaller than this, cut out all but the two largest canes.



BN-35910

Left: Red raspberry plant before thinning and pruning. Right. The same plant after thinning and pruning.

FERTILIZING

To get maximum yields from your raspberry plantation, take a soil test and apply fertilizer before planting. Apply fertilizer every year in spring just as new growth begins.

Stable manure, if available, is best for fertilizing. It supplies organic matter as well as nutrients. Apply 10 tons per acre (20 MT/ha).

If stable manure is unavailable, use commercial 5-10-5 fertilizer. Apply it as a topdressing at a rate of 500 to 600 pounds per acre (560-670 kg/ha) or spread ¼ pound (100-125 g) in a wide band no closer than about 6 inches (15 cm) from the crown around each hill.

CULTIVATING

Raspberry plantations should be cultivated thoroughly and frequently enough to prevent grass and weeds from getting started.

Begin cultivating in early spring and cultivate as often as necessary to keep weeds down. Continue cultivating until harvesttime, resume cultivating after harvest, and continue it until late summer.

Do not cultivate in the fall; this tends to stimulate new growth, which is susceptible to winter injury.

To avoid harming shallow roots of the plants, cultivate only 2 or 3 inches (5.0 or 7.5 cm) deep near the rows. For best results and greatest safety, cultivate by shallow disking.

Where suitable land is unavailable or intensive culture is practiced, other crops may be grown between the raspberry rows the first year. Follow the fertilizer and water requirements of the intercrop so that the raspberries do not suffer.

Good crops for this purpose are cabbage, cauliflower, beans, peas, and summer squash. Do not grow potatoes, tomatoes, or eggplant with raspberry varieties.

Do not grow grain crops; they are not cultivated and take too much of the moisture and nutrients needed by the raspberry plants.

Do not grow intercrops after the first year; raspberry plants of bearing size need all the soil nutrients and moisture for satisfactory production.

Mulches are valuable in raspberry production. They help control moisture and weeds and add organic matter. Sawdust, straw, and bark may be used, but extra nitrogen fertilizer will be necessary to help break down the mulch.

USING HERBICIDES

Herbicides can be used as weed-control aids in raspberry plantings. The use of herbicides supplements cultivation and does not replace it.

Herbicides are most useful in controlling weeds within rows or hills, where hand hoeing otherwise would be necessary. The middles between rows and hills should be cultivated regularly even though herbicides are used near the raspberry plants.

For established plantings, spray the rows with a herbicide before the weeds and new canes emerge in early spring.

Herbicide recommendations vary depending on geographical location, soil type, and crop. The recommended chemicals for your area are available from local county agents and State Agricultural Extension Offices. Some chemicals require application by a licensed operator.

IRRIGATING

Raspberries need a large amount of water. Irrigation is essential in dry regions and often is profitable even in humid regions.

Irrigated plants are more vigorous and yield fruit over a longer season than unirrigated plants.

In semiarid and arid regions, begin irrigating at the same time you begin irrigating other garden crops.

Apply 1 to 2 inches (2.5-5.0 cm) of water once a week during the fruiting season and once every 2 or 3 weeks during the rest of the dry season. Light sandy soil needs more frequent irrigation than heavier soils.

In humid regions, irrigation pays only if soil moisture is de-

ficient during the time the fruit is growing and ripening. If a drought occurs from blossoming time until the end of harvest, apply 1 to 1½ inches (2.5 to 3.75 cm) of water once a week.

Drip irrigation using plastic tubes has been useful in raspberry production. The advantages are conserving water, operating under low pressure, and applying water during harvest. The major disadvantages are initial cost and the need for a good filter system.

HARVESTING

Berries that are firm, ripe, and sound bring the highest market price. To get maximum income from your raspberry plantation—

- Pick at least twice a week.
- Handle berries as carefully as possible.
- Discard all decaying, injured, or overripe berries.

The plantation should be picked over frequently to harvest the berries when they are at their best. During hot or wet weather, picking every other day may be necessary. Six to eight pickers per acre are needed for harvesting.

Handle the berries as carefully as possible. Use the thumb, index finger, and middle finger to pick the berries. Do not hold berries in the hand after picking. Place them gently in the cup or basket; do not drop them. After berries are placed in the basket, do not rehandle them.

Discard overripe, injured, or decaying berries. Separate firm fruit and very ripe fruit at time of picking. If two baskets are fitted in a waist carrier, one basket can be used for firm fruit suitable for shipping and the other for fully ripened fruit for canning or freezing.

After filling the baskets in the waist carrier, transfer them to a hand carrier, which always should be kept in the shade or cooled by refrigeration. Cooling is essential for shipping fruit.

PREVENTING WINTER INJURY

In parts of Colorado and in the West North Central States, raspberry canes need protection from cold, drying winter winds. Windbreaks are valuable and may be artificial (such as fences) or living (such as trees and high shrubs). Living windbreaks should not compete with the raspberries for nutrients and water. Usually, the canes can be protected sufficiently by bending all of them over in the same direction and holding them close to the ground with clods of earth. These clods are removed in the spring.

Danger of winter injury to raspberries can be reduced by locating the plantation on an elevated site. Cold air settles to low areas. Winter temperatures are colder, and spring frosts occur later in valleys and hollows than in surrounding upland areas.

NEMATODES

One of the most harmful pests to raspberry plantings is the nematode. Several types of nematodes attack raspberries, and some transmit virus diseases or increase root rots. A soil sample should be taken for nematode count. Local county agents or State agriculture extension offices can help with this sampling. Many soil fumigants are dangerous to handle and apply, and some require a chemical applicator's license to be used. Follow your extension agent's recommendations. As rates for applying the chemicals vary, depending on soil conditions and method of application, follow the manufacturer's directions for specific recommendations.

DISEASES AND INSECTS

Although insects sometimes are harmful to raspberry plantings, they are not as destructive as diseases. Raspberries are attacked by mosaics and other virus diseases, crown gall, wilt, and anthracnose.

Damage from disease can be minimized if these general suggestions are followed:

- Choose disease-resistant varieties.
- Plant only healthy stock.
- Plant black or purple varieties in fields that have not recently been used for tomatoes, potatoes, or eggplant.
- Remove old canes after harvest.
- Keep the field clean of weeds and fallen leaves.
- Destroy seriously diseased plants. Use pesticides when needed.

For specific information on control of insects and diseases, consult your county agricultural agent or your State agricultural experiment station or see USDA Farmers' Bulletin 2208, "Controlling Diseases of Raspberries and Blackberries."

PROPAGATING

Raspberries are not difficult to propagate. Many growers propagate new stock for themselves and sell propagated stock to nurserymen. Often, the first harvest from a new raspberry plantation is new planting stock, rather than fruit.

Black and purple raspberries are propagated by burying the tips of the canes; they root and form new plants. Red raspberry plants are propagated from suckers and from root cuttings.

To prepare black or purple raspberry plants for propagation, pinch off the tips of the canes when they are 12 to 18 inches (30-45 cm) high. The canes branch freely and form a large number of tips for burying.

In late summer, loosen the soil around each plant and bury the tips of the canes 2 to 4 inches (5-10 cm) deep. Point the tips straight downward in the soil.

The following spring, cut the new tip plants away from the parent plants by severing the old cane. Leave 4 to 8 inches (10-20 cm) of old cane on the new plants. After the old cane is cut, the new plants are ready to be set out in the field.

The simplest way to propagate red raspberry plants is by transplanting suckers in early spring. Usually, large suckers from the previous year are transplanted, but new suckers can be transplanted also. These current-year suckers are small, but they grow rapidly after they are transplanted.

To propagate red raspberry plants from root cuttings, dig pieces of root from around established plants in early spring. Cut the roots into 2- to 3-inch (5.0-7.5 cm) lengths and scatter the cuttings on the surface of a nursery bed. Cover them with 2 inches (5 cm) of soil.

New plants, which come up from root cuttings during the growing season, can be set out in the field the following spring.

Instead of digging roots of red raspberries for propagation, you can remove all the old plants from a section of the field. Pieces of roots are left in the soil; new plants grow from these pieces. The new plants can be set out in the field the next spring. Usually, another stand of plants will grow the second year. This system of propagation yields a large number of new plants.

VARIETIES

Following are descriptions of the major raspberry varieties grown in the United States. These descriptions include:

1. State where the variety originated.
2. Time of ripening.[2]
3. Characteristics.
4. Area of special adaptation.
5. Disease susceptibility.

For variety recommendations, consult your county agricultural agent or your State agricultural experiment station.

Commercial stocks of most raspberry varieties are infected with viruses. Obtain plants certified by your State department of agriculture as having originated from essentially virus-free stocks, whenever possible.

Red Raspberries

August Red

1. New Hampshire.
2. Fall cropping—earliest of commercial varieties.
3. Berries medium size, soft, light bright red. Plants medium vigor, hardy.
4. Northeastern United States.

Canby

1. Oregon.
2. Midseason.
3. Berries large, firm, light bright red. Plants vigorous, hardy, productive. Canes thornless.
4. One of the best varieties in Pacific Northwest for freezing. Not adapted to heavy soils.

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[2] The *date* of ripening cannot be given; it depends on many factors in addition to variety. The ripening time —very early, early, midseason, late, or very late—shows when a variety ripens in relation to other varieties grown on the same site. The time lapse between ripening of very early varieties and very late varieties may be as little as 20 days or as much as 40 days.

FAIRVIEW

1. Oregon.
2. Midseason.
3. Berries large, bright red, firm, and very good flavor. Berries make a good frozen pack. Plants are vigorous, productive, have long fruiting laterals.
4. Grown in Oregon and Washington. Can be grown on heavy soils.
5. Resistant to root rot.

FALLRED

1. New Hampshire.
2. Late summer crop; also a fall crop.
3. Berries medium size, firm, good flavor. Bushes everbearing, productive, vigorous, hardy.
4. Northeastern United States.
5. Should be grown from mosaic-free stock.

HAIDA

1. British Columbia, Canada.
2. Midseason.
3. Berries medium size, light bright red, medium firm, hardy, medium vigor.
4. Northwestern United States and British Columbia.

HERITAGE

1. New York.
2. Fall cropping—September to frost.
3. Berries medium size, bright red, medium firm, lower portion of cane may be saved to fruit next June. Plants hardy and vigorous.
4. Northeastern United States.

HILTON

1. New York.
2. Midseason.
3. Berries very large, firm, hard to pick, medium red, darken quickly. Bushes productive, stiff erect canes.
4. Northeastern United States.

LATHAM

1. Minnesota.
2. Late.
3. Berries large, medium red, firm but often crumbly, quality not high. Bushes very hardy, unusually vigorous, very productive, nearly thornless. Variety good for canning and freezing.
4. Standard red variety in East, hardy in North Dakota.
5. Should be grown from mosaic-free stock. Susceptible to mildew.

MEEKER

1. Washington.
2. Midseason.
3. Berries large size, firm, bright red color, long fruiting laterals, plants vigorous, hardy as Willamette or Puyallup.
4. Northwestern United States.
5. Resistant to mildew.

NEWBURGH

1. New York.
2. Midseason, slightly earlier than Latham.
3. Berries very large, bright red, firm, of good quality.
4. Grown in Northeastern States and Pacific Northwest.
5. Has some resistance to root rot on the Pacific coast. Should be grown from mosaic-free stock.

PUYALLUP

1. Washington.
2. Late.
3. Berries large, bright red, somewhat soft. Very good flavor. Good quality when fresh frozen or canned. Plants vigorous, hardy, moderately productive.
4. Grown principally in the Pacific Northwest where it is a major variety. Not adapted to heavy soils.

SENTINEL

1. Maryland.
2. Midseason to late.
3. Berries medium to large size, bright red, plants very vigorous, hardy, productive.
4. Mid-Atlantic States.
5. Resists injury from fluctuating winter temperatures.

SCEPTER

1. Maryland.
2. Fall cropping—late August to frost.

3. Berries large, medium bright red, plants vigorous, hardy.

4. Mid-Atlantic States.

5. Resists injury from fluctuating winter temperatures.

SEPTEMBER

1. New York.

2. Plant bears early summer and fall crops.

3. Berries medium size and bright red. Good tart flavor. Plants vigorous, hardy, and moderately productive.

4. Grown extensively in Eastern United States, especially as a home-garden variety.

5. Generally escapes mosaic.

SOUTHLAND

1. North Carolina.

2. Early.

3. Berries medium size, light red, medium firm. Plants medium vigor.

4. North Carolina to Maryland and west to Illinois, south through Arkansas.

5. Highly resistant to leaf spot, anthracnose, and mildew.

SUMNER

1. Washington.

2. Late.

3. Berries medium size, medium red, firm, with high flavor. Plants vigorous, hardy, productive.

4. Well adapted to heavy soils of Pacific Northwest. Somewhat cold hardy.

5. Resistant to root rot on the Pacific coast. Resistant to yellow rust.

TAYLOR

1. New York.

2. Late.

3. Berries very large, of high quality. Well liked for freezing.

4. A leading variety in New York and New England; well adapted to Northeastern States.

5. Susceptible to mosaic viruses and should be grown from mosaic-free stock.

WILLAMETTE

1. Oregon.

2. Midseason.

3. Berries, very large, nearly round, medium red, very firm, of good quality. Good for freezing and canning. Bushes vigorous, very productive, sucker freely.

4. Grown extensively in the Pacific Northwest.

Purple Raspberries

BRANDYWINE

1. New York.

2. Midseason.

3. Berries large to very large, firm, tart. Plants very hardy, vigorous, and productive. Propagated by tip layers.

4. Northeastern United States.

5. Susceptible to mosaic.

CLYDE

1. New York.

2. Late.

3. Berries large, firm, tart. Bushes hardy, very productive; vigorous, stout canes.

4. Northeastern United States.

5. Moderately anthracnose resistant.

Black Raspberry

ALLEGHENY

1. Maryland.

2. Midseason.

3. Berries medium to large, firm, good flavor. Plants vigorous and productive.

4. Mid-Atlantic States.

5. Some mildew resistance.

ALLEN

1. New York.

2. Midseason.

3. Berries large, firm, many ripe at one time. Bushes vigorous, productive.

4. North Central and Northeastern United States.

BLACK HAWK

1. Iowa.

2. Very late.

3. Berries, large, firm, glossy, have good flavor. Plants vigorous, productive, very hardy.

4. Widely grown in Eastern United States.

5. Somewhat anthracnose resistant but mildew susceptible.

BRISTOL

1. New York.
2. Midseason.
3. Berries large, firm, and high flavored. Hard to pick after rain. Plants vigorous, hardy, and productive.
4. Widely grown in Eastern United States.
5. Very susceptible to anthracnose.

CUMBERLAND

1. Pennsylvania.
2. Midseason.
3. Berries large, firm, have very good flavor. Bushes usually hardy and productive.
4. Widely grown in Eastern United States.
5. Susceptible to anthracnose and mosaic viruses.

DUNDEE

1. New York.
2. Midseason.
3. Berries large, glossy, firm; have good flavor. Plants vigorous, hardy, and productive. Fruit hard to pick after rain.
4. Mildew susceptible.

HURON

1. New York
2. Late midseason.
3. Berries large, glossy, firm, good flavor. Bushes hardy, vigorous, productive.
4. Adapted in Western New York and worthy of trial elsewhere.
5. Somewhat anthracnose resistant.

NEW LOGAN

1. Illinois.
2. Ripens a week earlier than Cumberland.
3. Berries are medium size, of good quality.
4. Liked for earliness in Michigan and Eastern United States.

MUNGER

1. Ohio.
2. Midseason.
3. Berries large, firm, have good flavor.
4. A leading variety in Oregon.
5. Susceptible to mildew.

PLUM FARMER (FARMER)

1. Ohio.
2. Early. Has short season; ripens so quickly that entire crop can be harvested in two or three pickings.
3. Berries large, firm, high quality. Bushes hardier than those of most other blackcaps, drought resistant.
4. An important variety in Oregon.
5. Susceptible to anthracnose and mosaic viruses; immune from curl virus.

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